

Claims

1. A system for aiming a transducer portion of an ultrasonic bladder instrument in order to capture an image of a human organ, comprising:

a function for generating a plurality of ultrasound scan planes, each separated by a selected angle, to produce a scan cone having an ultrasound scan cone boundary for scanning a human organ;

a function for determining the amount, if any, of the scanned organ which extends beyond the cone boundary, defining a cone violation;

a function for determining the extent to which the organ is centered within the ultrasound cone boundary when a cone violation is determined; and

a display indicating that re-aiming of the ultrasound transducer is necessary when there is a cone violation and the organ is not centered by a selected amount.

2. The system of claim 1, wherein the function for determining the extent of centering includes determining the percentage of the organ within an inner cone boundary relative to that within the ultrasound cone boundary, wherein the inner cone boundary is inside the ultrasound cone boundary, and wherein re-aiming of the transducer is necessary when the organ percentage is less than a preselected number.

3. The system of claim 2, wherein the preselected number is approximately 70%.

4. The system of claim 1, wherein the human organ is a bladder.

5. The system of claim 1, wherein the signal display is in the form of lighting one of four orthogonal directional arrows, wherein the directional arrow which is lit indicates the appropriate direction of movement of the transducer on the patient for improving centering of the bladder within the ultrasound scan cone boundary.

6. The system of claim 5, wherein a directional arrow is lit in one state when re-aiming of the transducer is necessary and in a second state when re-aiming is optional.

7. The system of claim 6, wherein the one state is a blinking light and the second state is a solid light.

8. The system of claim 1, wherein said percentage is determined using the number of scan planes within the inner cone boundary and the number of scan lines within the ultrasound scan cone boundary.

9. The system of claim 1, wherein the amount of bladder extending beyond the ultrasound cone boundary is determined by the distance between the front wall and back wall of the bladder at the ultrasound cone boundary.

10. A system for aiming a transducer portion of an ultrasonic instrument image in order to accurately capture the image of a human organ, comprising:

a function for generating a single ultrasound scan plane, wherein generation of the single scan plane is controlled by operation of a transducer control element;

a display showing a cross-section of the organ determined from information from the single ultrasound scan plane when the transducer is initially placed on the patient's abdomen; and

a function for implementing a three-dimensional ultrasound scan following termination of generation of the single ultrasound scan plane, when the cross-section of the organ on the display reaches a desired size by manipulating the position of the transducer on the patient, indicating desired aiming of the transducer.

11. The system of claim 10, wherein the human organ is the bladder.

12. The system of claim 11, wherein the control element is a switch, which is operated during aiming of the transducer and released when aiming is complete and the three-dimensional scan is to be initiated.

13. The system of claim 11, wherein the single ultrasound scan plane is generated continuously as long as the control element is operated.

14. The system of claim 11, wherein the desired size is a maximum cross-section of the bladder

15. A system for aiming a transducer portion of an ultrasonic instrument in order to capture the image of a human organ, comprising:

- a function for generating a plurality of ultrasound scan planes, producing ultrasound information concerning the organ, wherein the ultrasound information is within the range of 1%-10% of the ultrasound information for a full ultrasound image of the organ, wherein the scan planes are arranged in a cone configuration;

- a function for determining whether the scanned organ image extends beyond a cone configuration produced by said ultrasound scan lines; and

- a signal indicating that re-aiming is necessary if the organ image is beyond the cone configuration.

16. The system of claim 15, wherein the organ is a bladder.

17. The system of claim 15, including a set of orthogonal directional arrows, wherein the signal produces an illumination of one of the arrows if re-aiming is necessary, indicating direction of movement of the transducer to correctly orient the apparatus.

18. A method for aiming a transducer portion of an ultrasonic bladder instrument in order to capture an image of a human organ, comprising the steps of:

generating a plurality of ultrasound scan planes, each separated by a selected angle, to produce a scan cone having an ultrasound scan cone boundary for scanning a human organ;

determining the amount, if any, of the scanned organ which extends beyond the cone boundary, defining a cone violation;

determining the extent to which the organ is centered within the ultrasound cone boundary when a cone violation is determined; and

providing a display indicating that re-aiming of the ultrasound transducer is necessary when there is a cone violation and the organ is not centered by a selected amount.

19. The method of claim 18, wherein the function for determining the extent of centering includes determining the percentage of the organ within an inner cone boundary relative to that within the ultrasound cone boundary, wherein the inner cone boundary is inside the ultrasound cone boundary, and wherein re-aiming of the transducer is necessary when the bladder percentage is less than a preselected number.

20. The method of claim 19, wherein the preselected number is approximately 70%.

21. The method of claim 18, wherein the human organ is a bladder.

22. A method for aiming a transducer portion of an ultrasonic instrument image in order to accurately capture the image of a human organ, comprising the steps of:

generating a single ultrasound scan plane, wherein generation of the single scan plane is controlled by operation of a transducer control element;

providing a display showing a cross-section of the bladder determined from information from the single ultrasound scan

plane when the transducer is initially placed on the patient's abdomen; and

implementing a three-dimensional ultrasound scan following termination of generation of the single ultrasound scan plane, when the cross-section of the organ on the display reaches a desired size by manipulating the position of the transducer on the patient, indicating desired aiming of the transducer.

23. The method of claim 22, wherein the human organ is the bladder.

24. A method for aiming a transducer portion of an ultrasonic instrument in order to capture the image of a human organ, comprising the steps of:

generating a plurality of ultrasound scan planes, producing ultrasound information concerning the organ, wherein the ultrasound information is within the range of 1%-10% of the ultrasound information for a full ultrasound image of the organ, wherein the scan planes are arranged in a cone configuration;

determining whether the scanned organ image extends beyond a cone configuration produced by said ultrasound scan lines; and

providing a signal indicating that re-aiming is necessary if the organ image is beyond the cone configuration.

25. The method of claim 24, wherein the organ is a bladder.